Abstract

The prevalence of "networks" in today's world is undeniable. From engineered networks such as the power grid or the World Wide Web to more natural networks like social networks, we interact with networks on a daily basis. With the rapidly increasing size and complexity of networks comes a new set of technical challenges that must be addressed to effectively control such systems. For example, scaling up a swarm of wirelessly networked robots may introduce network congestion problems that did not exist for a smaller network. In this case, a new distributed control solution that is mindful of the physical limitations of wireless communication must be sought out. Combining tools from network science and control theory, I am interested in developing resource-aware solutions where local actions are taken while still guaranteeing some system level properties.

In this talk I focus on an illustrative multi-agent coverage control problem and present algorithms that greatly reduce the amount of required wireless communication when compared to traditional approaches while preserving quality of service. The algorithms presented provide individual agents with a sufficient level of autonomy such that they can decide for themselves when wireless communication is necessary to maintain a global desired level of service.

Biography

Cameron Nowzari received his B.S. in Mechanical Engineering from the University of California, Santa Barbara in June 2009. He received his Ph.D. in Engineering Sciences from the University of California, San Diego in September 2013. He is currently working as a Postdoctoral Research Associate at the University of Pennsylvania. His research interests include dynamical systems and control, sensor networks, distributed coordination algorithms, optimization, robotics, event- and self-triggered control, Markov processes, and spreading processes. He was a finalist for the Best Student Paper Award at the 2011 American Control Conference and received the 2012 O. Hugo Schuck Best Paper Award in the Theory category for his work on distributed self-triggered coordination of mobile robotic networks.